Australian National University

Research School of Biology Newsletter

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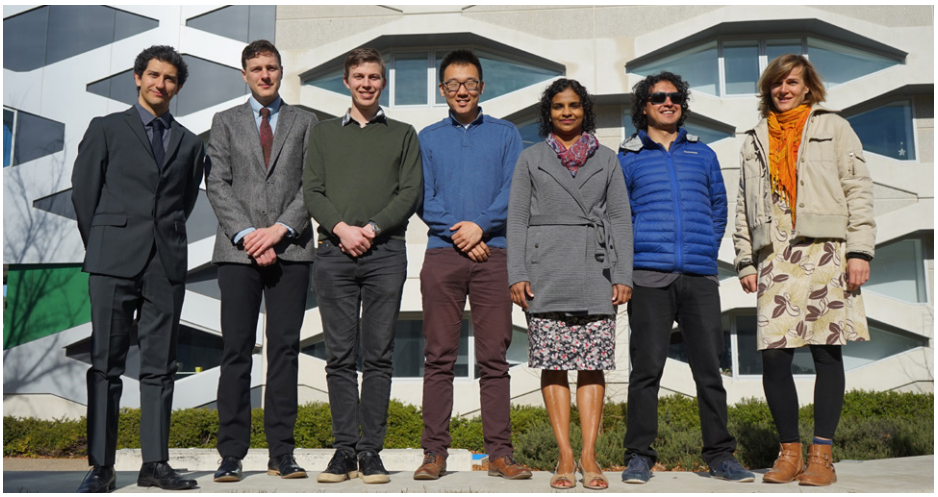
ANU COLLEGE OF MEDICINE, BIOLOGY AND ENVIRONMENT

NEWS

Congratulations to our newest PhDs

RSB congratulates our latest PhD graduates, who were awarded their degrees in the mid-year graduation ceremony on 12 July. The thirteen new Doctors are:

Heli Barron Pastor (Gordon group, E&E), **Mozes Blom** (Moritz group, E&E), **Carlos Bustos-Segura** (Foley group, E&E), **Christina Carroll** (Fahrer group, BSB), **David Duchene** (Cardillo group, E&E), **Buddhima Kariyawasam** (Atkin group, PS), **Yi-Leen Lim** (Whitney group, PS), **Tepsuda Rungrat** (Pogson group, PS), **Alan Severini** (Evans group, PS), **Jaime Simbaqueba** (Jones group, PS), **Robert Summers** (Martin group, BSB), **Laura Wedd** (Maleszka group, E&E), and **Renate Zelger** (Maier group, BSB).



Congratulations to our latest PhD graduates! From left: David Duchene (Cardillo group, E&E), Robert Summers (Martin group, BSB), Liam Bailey (Langmore group, E&E), Mozes Blom (Moritz group, E&E), Buddhima Kariyawasam (Atkin group, PS), Jaime Simbaqueba (Jones group, PS), and Renate Zelger (Maier group, BSB).(See: News Item)

Daintree undergratuate field trip

Student Rosie Clark, Adrienne Nicotra (E&E) and crane driver Andrew Thompson heading up to the canopy in the rainforest crane at the James Cook University Daintree Forest Observatory

Thirty-three undergraduate students from a variety of backgrounds spent 2 weeks in Cape Tribulation, north of Cairns, this month, as part of the BIOL 2203/3303, Field studies in functional ecology course.

The group, led by course convener **Adrienne Nicotra** (E&E), stayed at the James Cook University Daintree Forest Observatory, which boasts the only rainforest canopy crane in the Southern hemisphere (there are 12 in the world).

Six BIOL3303 students conducted small independent projects in functional ecology, and also served as peer mentors to the other students, who were from a range of different backgrounds.

The BIOL2203 students each conducted four small group projects and had lectures and workshops, on topics ranging from experimental design and statistics, to research integrity and science writing.

Each of the 12 research projects was supported by a resource person who assisted the students as they designed, carried out, analysed and presented their results as a scientific symposium talk.

Resource people included RSB PhD students, **Sonya Geange** (Nicotra group, E&E), **Joshua van Lier** (Fulton group, E&E), and **Michaela Purcell** (Rowell group, E&E), plus **Alex Maier** (BSB), **Patrick Meir** (PS), **Chris Fulton** (E&E), **Adrienne Nicotra** (E&E), **Dave Rowell** (E&E) and two colleagues from James Cook University, Susan Laurance and Lucas Cernusak. Technical support was provided by **Wes Keys** (DTO, E&E).

"Student feedback, as assessed through minute papers and reflective writings has been outstanding, as students report growing confidence and enthusiasm about the subject, their degree, and their future prospects applying their science degrees in diverse ways", says course convenor Adrienne Nicotra.

"Next year the courses will be offered in December at Kosciuszko National Park, and a modified version of the third year course is in development with colleagues at Nanyang Technical University in Singapore as well."

For more about this trip, click here.

Dave Rowell (E&E), Wes Keys (E&E) and Alex Maier (BSB) all harnessed up and ready to step into the crane bucket (behind them), for their trip up to the canopy in the rainforest crane.

Female Northern Green Jumping Spider, *Mopsus mormon*, in the Daintree rainforest. Image Dave Rowell.

Outreach News

Paul Cooper (E&E) and Thomas Wallenius (formerly E&E) produced a survey of the aquatic invertebrates in Mulloon Creek, NSW.

Grants

Kai Chan (Pogson Lab, PS) has been awarded a research fellowship (~AU$570,000 over six years) by the Flanders Research Foundation (FWO) to

DECRA Fellow profile: Angela McGaughran (Moritz group, E&E)

Research background

I completed my PhD in late 2009, working on phylogeography and ecophysiology of Antarctic invertebrates at Massey University. I then completed a ~4-year post-doc at the Max Planck Institute in Tübingen, Germany, focusing on nematode population genomics. In 2014, I moved to Canberra to work at CSIRO, where I worked on comparative genomics of the moth genus, Helicoverpa. In 2016, I crossed the road to start my DECRA fellowship here at ANU.

Current research interests

I am primarily interested in combining genomic and ecological approaches to examine evolutionary processes in natural populations. My DECRA involves extracting DNA from very old (> 100 yrs) specimens of H. armigera, a pest moth that costs millions of dollars in management and crop yield losses globally. These older specimens were collected in Australia before the use of insecticides. By comparing their genomic sequences to those of modern day samples that are resistant to insecticides, I am examining the mechanisms underlying rapid evolution of insecticide resistance. I also have several collaborative projects at ANU and CSIRO, focusing on using genomics to understand how organisms adapt to different environments.

What do you enjoy most about research?

Throughout my research career, I have been fortunate to spend time in some exotic places, including the sub-Antarctic and Antarctica, and I've gotta say, you just can't beat writing up your thesis while watching the whales go by! I also enjoy the autonomy of driving my own research, as well as working with others to see projects through to fruition.

This newsletter is archived at biology.anu.edu.au/news-events/newsletter.
Layout: Mel Norris
Editing: Stefan Bröer & Mel Norris

investigate the coordination of different organelle signals in plant cells.

Stephen Fairweather (Bröer group, BSB) won a travel grant from the Australian Physiological Society (AuPS) to attend the AuPS Research Networking Initiative. The initiative is a sponsored research visit to UNSW Sydney, and aims to support the development of national networking by student members of the Society.

Awards

Aaron Smith (Pogson group, PS) was awarded a University Medal for his outstanding undergraduate record, and Honours thesis.

Aaron Smith (Pogson group, PS) and **Rachel Rathjen** (Adamska group, BSB) were awarded the RSB Director's prize in Honours. The prize is awarded to students who achieve a final mark of above 90, and comes with a certificate and a $200 prize.

RSB Director's prize in Honours winners Aaron Smith and Rachel Rathjen, with RSB Director Allen Rodrigo. Image Sharyn Wragg

Buddhie Nanayakkara (Gordon group, E&E) won an award for her poster at the Australian Society for Microbiology (ASM) conference held this month in Hobart, Tasmania. The poster was entitled '*Escherichia coli* bloom strains have acquired a *Klebsiella* capsule gene cluster'.

Promising young RSB parasitologists have made their mark at the recent Conference of the Australian Society for Parasitology in the Blue Mountains (Leura):
Adelaide Dennis (Kirk group, BSB) won the prize for the best short (5-min) presentation. Adelaide talked about the phylogenetic analysis of ATP4 – a P-type ATPase and drug target of the malaria parasite.
Melanie Ridgway (Maier group, BSB) won the prize for the best long format presentation at the same conference. She managed to weave astronauts, fats and sex differentiation of the malaria parasite into a seamless storyline. - **Alex Maier**, BSB.

Benjamin Schwessinger (Rathjen group, PS) has been elected to join eLifes Early Career Advisor group. Five members were elected, from a total of 128 applicants.

IN THE MEDIA

A paper by **Naomi Langmore** (E&E) and Rob Heinsohn (Fenner), about palm cockatoos using sticks and seed pods to drum a rhythm has been featured widely in the media, including The New York Times, New Scientist, and National Geographic.

Palm cockatoos - the bird on the right is using a stick to drum a rhythm on a branch. Image C. Zdenek

NEW APPOINTMENTS

Welcome to **Joy McDermid**, who joined the Biology Teaching and Learning team this month, as the senior coursework student administration officer. Joy replaces **Patti Seddon**, who retires from ANU at the end of this month. Joy comes from the Research School of Earth Sciences, and previously worked at the College Office.

New director of APPF NCRIS facility

Due to a continued growth in commitments **Justin Borevitz** (PS) has stepped aside from the formal directorship of the Australian Plant Phenomics Facility (APPF) ANU node. **Tim Brown** (Borevitz group, PS), pictured above, took on the role of Director from 1 July. Tim has been working with the node for the last three years and has led the design and implementation of all the image-based phenomics capabilities at APPF ANU node, including the development of APPF ANU phenomics tools such as:
• the chamber and glasshouse camera

hardware and timelapse capture systems
• camera control and image management and processing pipeline
• web-based timelapse player
• point cloud and gigapixel imaging systems,
• visualization tools and control software
• TraitCapture pipelines and websites.
Tim and the APPF team are located in the new APPF office situated in part of the old teaching and learning office next to the Linnaeus drop-in centre. - **Aly Weirman**, Operations Manager, APPF ANU node.

The Division of Plant Sciences held a barbeque lunch to mark the retirement of **Adrienne Hardham**, and to celebrate her continuation as a research active Emeritus Professor.

Adrienne Hardham with her retirement gift from the Division of Plant Sciences, a vase from Canberra Glassworks. Image Owen Atkin

FAREWELL

Congratulations to **Ryan Phillips** who has just been appointed as a Senior Lecturer in Plant Ecology at La Trobe University in Melbourne. Ryan is currently a DECRA fellow in the Peakall lab group and will take up his position at the end of his fellowship in July 2018. - **Rod Peakall**, E&E.

Lauren Venugoban (von Caemmerer and Evans groups, PS) left RSB this month. She worked in a number of groups at RSB before joining the von Caemmerer/Evans group as a technical officer two years ago. She is now taking up a new position with the Plant Oil Engineering group at CSIRO. We wish you all the best, Lauren! - **Hannah Birke** (von Caemmerer group, PS).

PHDS SUBMITTED

Shao-Yu Lin (Solomon Group, PS) 'The study of transcriptional regulation of necrotrophic effector genes ToxA and Tox3 in the wheat pathogen *Parastagonospora nodorum*'.
Belinda Vangchhia (Gordon Group, E&E) 'Genetic structure and antimicrobial resistance of foodborne Escherichia coli in Australia'.
Julian Greenwood (Evans Group, PS) 'Wheat inflorescence architecture'.

PHD AWARDED

Hong Kiat (Don) Lim (O'Neill Group, BSB) 'Spleen as a site for hematopoesis'.
Amanda Edworthy (Langmore Group, E&E) 'Ecology and conservation of endangered Forty-Spotted Pardalotes'.

MPHIL AWARDED

Ojas Dixit (Gordon Group, E&E) 'Within-host evolution and immigration of *Escherichia coli* in the human gastrointestinal tract'.

PAPERS ACCEPTED

Breen SA, Williams SJ, Outram M, Kobe B, Solomon PS, Emerging insights into the functions of pathogenesis-related protein 1, *Trends in Plant Science.*

Evans JR, Morgan PB, von Caemmerer S, Light quality affects chloroplast electron transport rates estimated from chlorophyll fluorescence measurements, *Plant & Cell Physiology.*

Hilder TA, Robinson A, Chung SH, Functionalized fullerene targeting human voltage-gated sodium channel, $hNa_v1.7$, *ACS Chemical Neuroscience.*

Hoops D, Vidal-García M, Ullmann JFP, Janke AL, Stait-Gardner T, Duchene D, Price WS, Whiting MJ, Keogh JS, Evidence for concerted and mosaic brain evolution in dragon lizards, *Brains, Behaviour and Evolution.*

Laver RJ, Nielsen SV, Rosauer DF, Oliver PM, Trans-biome diversity in Australian grass-specialist lizards (Diplodactylidae: *Strophyrus*), *Molecular Phylogenetics and Evolution*.

Li Y, Yu Z, Liu X, Mathesius U, Wang G, Tang C, Wu J, Liu J, Zhang S, Jin J, Plastic yield responses in soybean cultivars to elevated CO2 are driven by increased nitrogen fixation at the reproductive phase, but not by increased soil nitrogen uptake or changes in root architecture. *Frontiers in Plant Science*

Osmond B, Chow WS, Wyber R, Zavafer A, Keller B, Pogson BJ, Robinson SA, Relative functional and optical absorption cross-sections of PSII and other photosynthetic parameters monitored *in situ*, at a distance with a time resolution of a few seconds, using a prototype light induced fluorescence transient (LIFT) device, *Functional Plant Biology.*

Pearce S, Clarke D, East P,...Jermiin L, McGaughran A, *et al*, Genomic innovations, transcriptional plasticity and gene loss underlying the evolution and divergence of two highly polyphagous and invasive *Helicoverpa* pest species, *BMC Biology*.

Ramirez-Esquivel F, Ribi W, Narendra A, Techniques to investigate the anatomy of the ant visual system, *JoVE*.

Sherratt E, Vidal-García M, Anstis M, Keogh JS, Adult frogs and their tadpoles have different macroevolutionary patterns across the Australian continent, *Nature Ecology and Evolution.*

Vidal-García M, Keogh JS, Invasive cane toads are unique in shape but overlap in ecological niche compared to Australian native frogs, *Ecology and Evolution.*

Vidal-García M, Keogh JS, Phylogenetic conservatism in skulls and evolutionary lability in limbs - morphological evolution across an ancient frog radiation is shaped by diet, locomotion and burrowing, *BMC Evolutionary Biology.*

Zavafer A, Koinuma W, Chow WS, Cheah MH, Mino H, Mechanism of photodamage of the oxygen evolving Mn cluster of Photosystem II by excessive light energy, *Scientific Reports*.

Zheng Z, Reichel M, Deveson I, Wong G, Li J, Millar AA, Target RNA secondary structure is a major determinant of miR159 efficacy, *Plant Physiology*.

NOTICES

ANU moves to FIGTREE incident reporting
The ANU has adopted the online FIGTREE system for the reporting and management of incidents and hazards. We have set up an Intranet page to gather the various new links and instruction sheets into one accessible place. If you have any questions, contact RSB Compliance. - **Jeremy Weinman**, Compliance Coordinator.